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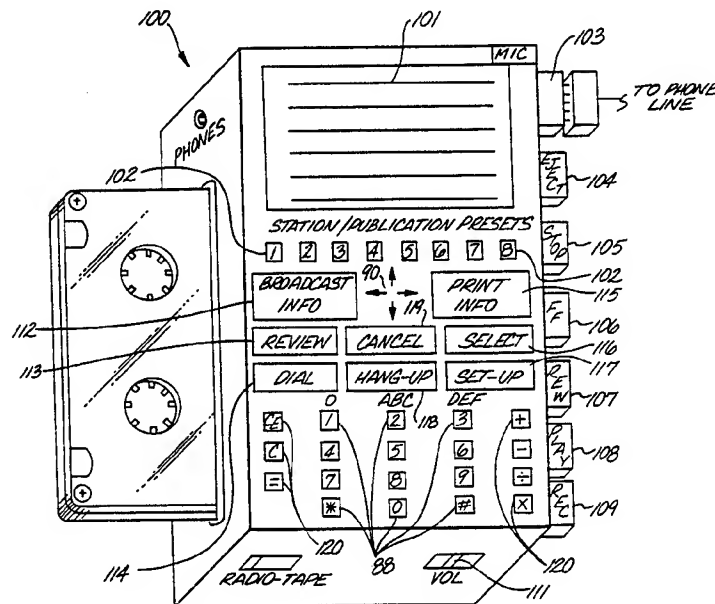
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MATION RELATING THERETO

## (57) Abstract

Apparatus for providing auxiliary information of broadcast programs (100). The apparatus allows a user to instantaneously identify a broadcasting program by actuating a switch (116). An identification of the station broadcasting the program, the date and the time of the broadcasting program is registered in a memory upon actuation of the switch. The identification can then be sent to a center in which a schedule of the broadcast programs is stored, along with other auxiliary information which the respective broadcasters wish to provide. From the program identification, such information can then be retrieved and sent to the user. The identification information from the user is stored by the center and used to compile audience-monitoring statistics.

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**APPARATUS AND METHOD FOR IDENTIFYING  
BROADCAST PROGRAMS AND ACCESSING  
INFORMATION RELATING THERETO**

Field of the Invention

The invention relates in general to broadcast media which includes radio and television and to print media (magazines, newspapers, etc.) and, in particular, to identifying selections from such media so that auxiliary information relating to these selections can be accessed.

Background of the Invention

The media have experienced the following problems for a long time:

(A). A listener of radio may hear a song of interest and decides to buy it, but does not know the title or artist. Frequently the announcer of the radio station does not state the title, artist or other information of the song, or even if the information was announced, it was before the song played. The listener must wait until the song is heard again and hope that the title and artist are announced after the song. Even when the information of the song are announced and heard, there are situations where such information cannot easily be retained (such as when a listener is operating an automobile or simply when a listener does not have something to write on or write with).

The problem is especially true for commercials, for which the listeners usually must memorize information that are difficult to memorize, such as telephone numbers and addresses for ordering the products advertized. If listeners fail to remember these items of information, the effects of the commercials are diminished.

Similarly, a viewer of television may be scanning through different channels and start watching a program that is already in progress. After a few minutes, the viewer may decide to view the show the next time it is on, because the viewer wants to see it in its entirety or the viewer may be watching something else. Therefore, the viewer must physically search through the current and subsequent TV program listings until the next showing of the program is found. This is time consuming and if several months pass, the viewer may forget the name of the show.

Despite the above described long-felt inconvenience to so many in the audience, no satisfactory solution has so far been found.

(B). An alternative channel is needed to provide additional information for a commercial. For example, an advertizer may only be able to finance a half-minute prime time commercial. If a less expensive alternative channel is available for providing additional

1 information (e.g. price quotes, store hours, details of a product, etc.) to listeners, the  
advertiser can then have more flexibility to fashion a commercial, such as by spending the  
whole half minute on features that may attract the listeners or putting the commercial on for  
5 only a few days, and let the listeners access other information from the less expensive  
alternative channel.

The same alternative channel is also needed for newspapers and magazine  
advertisements which have a limited lifetime. For example, the Sunday paper real estate  
section typically lists homes which may only be available for viewing on that day. If a  
10 second channel of information is available, then information about the home can still be  
available to the readers even when the advertisement is taken off.

Despite the above identified economic benefits, a satisfactory and less expensive  
alternative channel of communication has yet to be found. Prior art systems in this regard  
all require a station to broadcast the information in a secondary signal, concurrently with the  
15 broadcasting of the main program, and the listeners must be equipped with special decoder  
circuits for recovering the information.

For example, the European radio broadcast systems (RDS) broadcast the  
identification of a program in the SCA band and require the listeners to have special receivers  
20 to decode and display this identification.

There is also a proposal to transmit identification of a television program  
during the vertical blanking interval (VBI) period. Unfortunately, special decoders are also  
needed under such method.

And in the I PLUS system, described in patent application Serial No.  
25 07/806,152, filed December 11, 1991 (incorporated herein by reference), auxiliary  
information relating to a broadcast program or printed material is retrieved using a code  
number referred to as an I PLUS number which is broadcast or printed along with the  
program or print material. The code number is used for delayed recording from a television  
or a radio of a broadcast program containing the auxiliary information. However, the I  
30 PLUS system does not retrieve information until the next day, and it requires a television and  
VCR for such retrieval.

(C). Advertising rates for commercials of television programs are determined  
by the expected size of viewer audience for a predetermined number of television programs.  
35 These expectations are usually determined by the estimated audience sizes of previously  
broadcast shows. For example, for a weekly television series, the estimate of audience size  
for upcoming episodes is based on the estimated size of previously broadcast shows. In

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addition, advertising rates may be adjusted based on an "after the fact" estimation of the market share for the televised program.

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The present systems for estimating market share involve survey evidence such as the Nielsen ratings. Previous market data was taken by selecting households to record their viewing habits. For example, a selected household might record in a written journal or diary when the television is turned on and turned off, what channels are selected and the number of viewers in the room. This data may alternatively be collected by providing the user with an electronic device having a button that indicates turning on or off the television and the channel selected. Other systems are connected directly to the television that will monitor power on and off and the channel and time of the selected programs. The system is wired to a dedicated telephone line. When instructed, the electronics dump their memory over the phone line to a central computer for analysis. Each of these systems requires selecting individual households that represent an adequate sample of the general viewing audience and requires physically setting up the monitoring apparatus. These systems are inaccurate because the sample size is small, diary entries may be erroneous, or require viewer action.

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However, despite its importance to advertisers and the media, a method for gathering such data has yet to be found.

### Summary of the Invention

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In one aspect, this invention discloses apparatus for facilitating access of auxiliary information relating to a selected program broadcast from radio and television and to selected articles in a publication. The apparatus for facilitating access of auxiliary information from broadcast media comprises a memory, means for receiving an input signal, means responsive to the input signal for providing an instantaneous identification of the program as a function of the time instance at which the input signal is received and means for storing the identification in the memory.

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In another aspect, this invention discloses a system for communicating information between an audience and at least one broadcast station. The system comprises an electronic program information retrieval system storing information relating to programs broadcast from the station, means coupled to the electronic program information retrieval system for receiving a request from the audience, and means responsive to the request for retrieving the information from the electronic program information retrieval system and transmitting the information to the audience. In an embodiment of this invention, means are

1 provided in the electronic information retrieval system for collecting requests from audience as data for estimating the size of the audience of a program.

5 In yet another aspect, this invention relates to a receiver of broadcast programs. The receiver comprises means for receiving broadcast programs from one of a plurality of stations at different frequencies, a clock continually providing a time measure in day, hour and minute, and means for instantaneously identifying a broadcast program, comprising a memory, means for receiving an input signal from a user, and means responsive to the input  
10 signal for storing a program identification into the memory. The program identification includes the time at which the input signal is received and an identification of the station broadcasting the program.

#### Brief Description of the Drawings

15 The foregoing features of the present invention would be better understood upon consideration of the following detailed description of certain preferred embodiments taken in conjunction with the accompanying drawings in which:

Fig. 1 is a drawing of a radio/recorder unit in which the present invention is embodied.

20 Fig. 2 shows an internal design of the radio/recorder unit of Fig. 1.

Figs. 3a-3c is a flow chart illustrating the steps performed by the CPU of the unit in Fig. 2 in response to actuation of keys on the unit 100 shown in Fig. 1.

25 Figs. 4a-4d show different menus displayed on the radio/recorder unit of Fig. 1 during setup.

Fig. 5 is a flow chart illustrating the steps performed by a program information retrieval system to send information to the user.

Fig. 6 is a schematic block diagram of another implementation of this invention for identifying a broadcast program.

30 Fig. 7 is a schematic block diagram illustrating a design of an automatic information machine (AIM) wherein information on broadcast programs can be retrieved.

Fig. 8 is a diagram of another embodiment of the present invention.

Fig. 9 is a schematic block diagram illustrating an internal design of the embodiment shown in Fig. 8.

#### Description of the Preferred Embodiments

35 Fig. 1 illustrates a portable radio/recorder unit 100 in which the present invention is embodied. The unit 100 has a conventional radio and a tape recorder. The

1 radio has a tuner for receiving broadcast signals from different radio stations, including  
amplitude modulation (AM) stations and frequency modulation (FM) stations. As an option,  
television audio reception is added to the FM tuner so that the unit 100 can receive audio  
5 signals from television (TV) stations. (Hereinafter, a "station" may also be referred to as a  
"channel").

Like many of today's units, unit 100 has a circuit for providing a time-of-day  
clock in hour, minute and second. Preferably, the clock further measures day, as well as  
month and year. The time measure of the clock is displayed on a display 101.

10 Like many conventional units, the unit 100 is equipped with a plurality of  
station presets. The station presets allow a user to selectively store certain stations into a  
memory so that the unit 100 can be tuned to any one of the preset stations by simply touching  
a Station/Publication Preset key 102.

15 The unit 100 has a circuit for generating dual tone multiple frequency (DTMF)  
signals so that it can send messages through a telephone. A jack 103 for receiving a  
telephone plug is provided.

As will be described in reference to Fig. 2, a random access memory (RAM)  
is provided to store a plurality of telephone numbers, one corresponding to each of the station  
20 presets.

The display 101 is preferably one with low power consumption such as a liquid  
crystal display (LCD). It is normally used to display the frequency of the tuned station  
and/or the time of day.

25 The unit 100 also has a conventional magnetic tape recorder PLAYER. As in  
many standard recorders, a set of keys, including the EJECT 104, STOP 105, FF (fast  
forward) 106, REW (rewind) 107, PLAY 108 and REC (record) 109 keys are provided. And  
as in many conventional units, the unit 100 also has a radio-recorder key 110 to allow a user  
to select either the radio or the recorder, as well as a VOL control 111 to allow a user to  
30 change the volume output.

The unit 100 has a set of telephone keys 88-1 through 88-12 to provide a  
twelve-button key pad similar to that of a conventional telephone. In particular, the telephone  
keys 88-1 through 88-12 are the number keys "1" through "0", the star "\*" key and the  
pound sign "#" key respectively. The letters of the alphabet are assigned to the telephone  
35 keys "2" through "9" as they are for a conventional telephone. For example, the letters ABC  
are assigned to the telephone key "2". However, unlike the conventional telephone key pad,  
the letters Q and Z are assigned to the telephone keys "1" and "0" respectively.

1 Alphabet characters are entered by a double key entry which is well-known to those skilled in the art. Each character is represented by two numbers. For example, the telephone key "2" corresponds to the letters ABC. However, pressing the key "2" once does  
5 not uniquely select one of the three letters. By pressing the "1" key, after pressing the "2" key, the first character or "A" is entered. Similarly, if "B" is being selected, the user presses the telephone key "2" and then again presses the telephone key "2" to select the second character "B". Other characters are similarly entered.

10 Alternatively, a standard qwerty keyboard such as used for typewriters or computers may be used.

A set of cursor keys 90 is provided to let a user moves a cursor on the display 101. The cursor keys 90 include a left arrow key for moving the cursor to the left, an up arrow key for moving the cursor upward, a down arrow key for moving the cursor downward  
15 and a right arrow key for moving the cursor to the right.

Beside the above described keys, the unit 100 also has a set of keys, including a BROADCAST INFO key 112, a DIAL key 114, a REVIEW key 113, a CANCEL key 118, a HANG UP key 119, a PRINT INFO key 115, a SELECT key 116 and a SETUP key 117. The functions of these keys will be described below along with reference to the flow charts  
20 of Figs. 3a-3b.

Fig. 2 is a schematic block diagram of an internal design of the unit 100. Operation of the unit 100 is controlled by a central processing unit (CPU) 201. The CPU 201 can be any one of the many off-the-shelf microprocessors on the market, such as a 8080 microprocessor manufactured by Intel Corporation, or a custom-made chip. It is coupled to  
25 a read only memory (ROM) 202 which stores operation software for operating the CPU 201.

The CPU 201 is connected to a random access memory (RAM) 203. The RAM 203 is used for storing the station presets and program identifications. It is also used for providing a scratch pad for the CPU 201 in performing other functions such as in  
30 operating the display 101. Since it is contemplated that the unit 100 is portable, at least a portion of the RAM 203 is therefore implemented with non-volatile memory, such as a electrically erasable programmable read only memory (EEPROM) or a volatile memory with a battery backup, so that reusable data can be stored.

35 The CPU 201 is coupled to a display control circuit 204 which controls the display 101, a clock circuit 206 which controls the clock. The digital tuner of the unit 100 is controlled by the CPU 201 through a digital tuner circuit 207, and the tape recorder of the unit 100 is controlled by the CPU 201 through a tape recorder control circuit 210. Designs



1 for these circuits are known to a person skilled in the art, therefore, detail explanation thereof is deemed unnecessary.

5 Optionally, CPU 201 is also connected to a radio frequency section and audio amplifier, to which a head phone or a speaker can be connected.

10 The unit 100 has a microphone which is controlled by the CPU 201 through a conventional microphone interface 205. The CPU 201 also has control of a telephone and acoustic coupler 208 through a circuit 208, and a DTMF generator and decoder through a DTMF circuit 209. The circuit 208 can be connected directly to telephone jack 103, or optionally to an acoustic coupler located on the rear surface of the unit 100. These devices are used for connecting to a remote program information retrieval system (PIRS) and for receiving from the PIRS auxiliary information on a broadcast program. Each of the circuits 208 and 209 can use one of the designs available in the art. Although all three devices are shown in Fig. 2, not all of them are needed.

15 The CPU 201 controls and receives the plurality of enhancement keys shown on Fig. 1, specifically the BROADCAST INFO key 112, the DIAL key 114, the REVIEW key 113, the CANCEL key 118, the HANG UP key 119, the PRINT INFO key 115, the SELECT key 116 and the SETUP key 117.

20 In addition to its function as a regular radio or a recorder PLAYER, unit 100 also operates to provide instantaneous identification and registration of broadcast programs of interest to a user. These functions are now described with reference to the flow charts of Figs. 3a-3b.

25 When powered up, preferably by batteries (not shown), the unit 100 operates as a standard radio or a standard recorder, depending on the setting of the radio-tape key 110. An identification of the tuned station and the time-of-day clock may be shown on the display 101.

30 When any one of the enhancement keys is actuated, the CPU 201 is interrupted and a corresponding interrupt subroutine is executed.

35 When the SETUP key 117 is activated, step 401 is performed in which a setup menu similar to that illustrated in Fig. 4a is put on the display 101. The setup menu allows a user the options of: (1) setting the preset keys 102 to preferred stations by selecting the "BROADCAST STATIONS" option, (2) setting the preset keys to preferred publications by selecting the "PUBLICATIONS" option, (3) setting a user identification by selecting the "USER ID" option and (4) setting the clock 206 by selecting the "CLOCK" option. A user can select any one of these options by using the cursor keys 90 to move the cursor to a desired option and then pressing the SELECT KEY 116. When the SELECT KEY 116 is

1 pressed, the position of the cursor (step 422) is noted and this position is used to set a pointer to point to a location in the RAM 203 (step 423). Under the setup operation, the pointer would point to a routine in memory to be executed by the CPU 201 for setting the unit 100.

5 If the user selects the "BROADCAST STATIONS" option, step 402 is entered and a menu similar to that illustrated in Fig. 4b is displayed. Under this menu, a user can use the cursor key 90 to select any one of the entries corresponding to the preset keys 102. When the cursor key 90 is positioned at the selected entry, the user can then press the SELECT KEY 116. In step 403, the user can set the corresponding preset keys 102 to a  
- 10 selected station by entering the name and frequency of that station.

In step 403, the user can enter a telephone number which will be used for retrieving information from a program information retrieval system wherein programs broadcast from that station is stored. It is contemplated that the telephone number is provided  
15 by the television or radio station through publication in newspapers (e.g. the TV/radio section) or the television guides, etc. The telephone number may be the number for the station itself which has its own program information retrieval system, or it may be the number of a central location which keeps schedules and information of broadcast programs of several different stations in a PIRS.

20 The name, frequency and telephone number entered by the user at step 403 are stored into the non-volatile portion of the RAM 203.

The user can set another preset key 102 or execute the exit option which causes the CPU 201 to re-display the set-up menu of Fig. 4a.

25 If the user selects the "PUBLICATIONS" option, step 404 is entered and a menu similar to that shown in Fig. 4c is displayed. Under this menu, the user can set any of the preset keys 102 (steps 404 and 405) in a similar way as in steps 402 and 403, with the exception that in step 405, the user is no longer prompted to enter a station frequency. Instead, the name of the publication and a corresponding telephone number for the publication  
30 PIRS are entered. The data entered by the user are stored in the RAM 203 in similar a manner as that described in the previous paragraph.

35 If the user selects the "USER ID" option, step 406 is entered and a menu similar to that shown in Fig. 4d is displayed. Under this menu, the user can optionally enter his name, address and telephone using the alphabet option of the telephone keys 88. The entered data are stored in the RAM 203.

If the user selects the "CLOCK" option, steps 408 and 409 are executed and the CPU 201 prompts the user to enter a new clock value. As setting of the clock is similar

1 to that found in many existing television and VCR remote controls, detail explanation thereof is thus deemed unnecessary.

When the user finishes with the setup operation, the "EXIT" option can be  
5 selected from the setup menu of Fig. 4a to terminate the setup. The station frequency and the clock value are again displayed.

A user can tune the unit 100 to any one station and listen to the broadcast using headphones. When a program (including, music, commentary, commercial, etc.) from that station is of interest to the user, the BROADCAST INFO key 112 can then be actuated.  
10 Thereupon, step 411 is entered. In step 411, the CPU 201 stores into the non-volatile portion of the RAM 203 an identification of the station, along with the time of the clock at which the BROADCAST INFO key 112 is pressed.

The station can be identified by its broadcast frequency or the name of the station (e.g. using 105.1 to retrieve the name KKGO). Using the station name is considered  
15 more advantageous because it is easier for the listener to recognize the station name than recognizing the frequency.

From the identification stored in the RAM 203, the user can retrieve auxiliary information of an identified program. This is performed by connecting the unit 100 to a  
20 telephone using a modular connector or an acoustic coupler. When the unit 100 is connected, the user can press the REVIEW KEY 113.

When the REVIEW KEY 113 is actuated, program identifications previously stored in the RAM 203 are retrieved (step 414) and displayed on the display 101 (step 415).  
25 There are several formats in which this information can be displayed. For example, the stored identifications may be displayed with the identifications organized by stations. The advantage of this format is that the user can now review the identified programs for one station before the corresponding telephone number is dialed. Another format is to organize the identifications by dates. This format may help the user to more easily find a particular  
30 program previously registered.

When the previously identified programs are displayed, the user can use the cursor keys 90 to select the particular program of, or a particular station from, which the user is interested in getting the auxiliary information. When the program or the station is selected, the user can actuate the DIAL KEY 114 and the corresponding telephone number is retrieved  
35 (step 416) and dialed (step 417). When telephone connection is established, the CPU 201 retrieves the station identification from the RAM 203 and activates DTMF generator and decoder circuit 209. DTMF tones are then generated to send the program identification(s)

1 to the PIRS of the station or central location (step 418). After the program identification is sent, the CPU 201 waits for the PIRS to transmit the information back (step 419).

5 In step 418, a user identification, which was entered previously under the USER ID option, may optionally be sent to the PIRS. The user identification may be a name, address and telephone number as described previously, or it may simply be a number such as his social security number. Transmitting the user identification has the advantage that it allows the PIRS to send bulky written information through mail or by direct telephone call.

10 Fig. 5 is a flow chart illustrating the steps of the PIRS when a request is received.

Upon receiving a request (step 501), the PIRS uses the station ID from the program identification to locate data for that station (step 503). (However, if the PIRS is an in-house system of a station, step 503 may not be needed.)

15 In step 504, the clock value from the program identification is decoded to search the identified program. When the identified program is found, the PIRS retrieves auxiliary information (step 505) thereof.

20 Advantageously, the PIRS makes a record of the request. This record can then be used to provide statistical data for determining the popularity of the program, the station or other audience monitoring type data (step 506).

25 The PIRS sends the auxiliary information to the user by first sending a DTMF tone to unit 100 (step 507). The DTMF tone is received by the DTMF generator and decoder circuit 209 of the unit 100, which then interrupts the CPU 201. The CPU 201, upon interrupted by circuit 209, starts the tape recorder through control of the circuit 210. When the tape recorder is started, a signal is sent to the PIRS to initiate transmission of the auxiliary information (step 508). When the auxiliary information from the PIRS is received by the unit 100, they are stored on the tape.

30 If the auxiliary information relates to a musical selection, it might include the album, artist and title along with a short (e.g. 10 second) audio segment of the selection so that the user can relate the melody to the title. This concept is disclosed in my U.S. Patent No. 5,119,507. If the auxiliary information relates to an advertisement, a portion of the ad may be repeated along with the auxiliary information to relate the product or service to the additional information.

35 At completion of the transmission, the PIRS generates a DTMF tone to the unit 100 to stop the tape recorder and terminate the telephone connection (step 509). A signal can

1 also be generated at the unit 100 so that the user is alerted to the completion and availability of the auxiliary information.

Referring back to the flow charts of Figs. 3a-3b, if the user at any point during  
5 the retrieval of the auxiliary information decides to cancel the operation, the Hang Up key 119 can be actuated, and the telephone connection is cut (step 421).

When the program identifications are displayed upon actuation of the REVIEW  
KEY 113, a user may select to cancel a previously stored program identification from the  
RAM 203. This may be done by first using the cursor keys 90 to select the program  
10 identification the user wishes to cancel. Once the program identification is selected, the  
CANCEL KEY 118 can be actuated and the data corresponding to the selected program  
identification is thereby erased from the RAM 203 (step 420).

When the transmission is completed, the user can either hear the information  
15 directly from the tape recorder, or, optionally, the signals stored on the tape may be  
interpreted by the CPU 201 to produce text data which can then be displayed on the display  
101.

Although the above is described with reference to identifying a radio program,  
the invention is not so limited. As described above, during setup of the unit 100, a user can  
20 also program the preset keys to store names of different publications (such as the Los Angeles  
Times, Newsweek, Barrons, etc.), along with a corresponding telephone number for each  
publication. When reading an article, the user can press the corresponding preset key 102.  
When the user reads an article or an advertisement of interest, the PRINT INFO key 115 can  
be actuated to store the name of the publication into the RAM 203 (step 424). The CPU 201  
25 then prompts the user for a code number such as an I PLUS number (step 425), which may  
be found printed in the article or the advertisement. The user enters the I PLUS number  
through the telephone keys 88, which is then stored into the RAM 203 (step 426).

To retrieve information on the identified article or advertisement, the user  
30 connects the unit 100 to a telephone. The REVIEW KEY 113 can be actuated to display the  
identification and then the DIAL KEY 114 to connection the unit to the PIRS as described  
above. The information is then retrieved through the telephone connection as disclosed  
previously.

In the above described embodiment, the identification of a broadcast program  
35 is recorded as a number so that it is sent over the DTMF tone. However, if unit 100 has a  
modem, more detail program identification can be entered and sent to a PIRS, and a PIRS  
can send text information to unit 100. Moreover, if unit 100 has a modem, the transmitted

1 information need not be stored on the tape, but directly in the RAM 203 which can then be displayed at display 101.

5 As an option, the unit 100 can be implemented to have keys commonly found in a calculator, as shown in Fig. 1. The CPU 201 can then be implemented to be able to perform mathematics so that the unit 100 can be used as a calculator.

10 A user need not be listening to the unit 100 in practice, but can be listening to any radio or television (including a car radio), with the unit 100 set to the same tuned station. Then, if there is program of interest, the BROADCAST INFO key 112 can be actuated to identify the program.

15 Preferably, the clock 206 is set to correspond to the local time. If an audible DTMF tone can be broadcast by a local station on the hour a few times each day, a user can synchronize the unit 100 using its internal radio circuit or from another radio, using the microphone of the tape recorder to detect the audible tone and reset the clock to the hour.

20 Fig. 6 is a block diagram illustrating schematically another embodiment of the present invention. This embodiment is a receiver 600 which is a modification of a common radio or television. The receiver 600 comprises a radio receiver circuit 601, a digital tuner 603 and a tuner control circuit 604 all of which can be found in standard radio or television sets. As in many common units, the receiver 600 may have a clock 602. If a clock is not present, one can be built easily. Preferably, the clock 502 measures and indicates date in addition to hour, minute and second.

25 In accordance with the present invention, the receiver 600 has a circuit 606 coupled to the digital tuner 604 and the clock 602. This circuit 606 has means 608, such as a socket for receiving a non-volatile memory 607 such as a EEPROM, or a magnetic strip recorder receiving a card with a magnetic strip.

30 The circuit 606 is activated when a "BROADCAST INFO" key 609 is actuated. When activated, the circuit 606 operates to store an identification of the tuned station (e.g. its frequency from the digital tuner 604) to the memory 607, along with the value of the clock 602 at the time the key 609 is actuated.

35 Since the memory 607 may be used separately (i.e. in different receivers), it becomes necessary to have a memory management scheme so that the circuit 606 can know where to write new data thereon each time. One such memory management scheme is to maintain a pointer in the memory 607. The pointer is kept at a predefined location, such as the first address. It points to a location in the memory for inputting the next data. When the memory 607 is inserted into the socket 608, the pointer is read by the circuit 606.

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When a user hears a program of interest, the BROADCAST INFO key 609 can be actuated, which causes the station identification and the clock to be stored into the memory 607. Optionally, a user identification, which may be preset into the receiver 600, is also stored for purposes described above.

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The user can retrieve information of the broadcast program by removing the memory 607 from the socket 608 and inserting it in a retrieval device (hereinafter called an Automatic Information Machine).

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It is contemplated for this embodiment that a plurality of these Automatic Information Machines (AIMs) will be installed in different locations, such as in record stores and other retail establishments.

15

In the AIM, the time and station of the broadcast program is retrieved from the memory 607. From such identification, information such as the title (and/or other information, such as the singer) of a song is output in print form. With this information, the user can, for example, either purchase a record of the song, or other records by the same singer.

20

Fig. 7 is a block diagram illustrating a design of an AIM 700. The AIM 700 is controlled by a central processing unit (CPU) 701. Its operation is performed through execution by the CPU 701 of operating software stored in a read only memory (ROM) 702. The AIM 700 also has a clock 713 and memories (such as an audio tape drive 703, a disk 704 or semiconductor memory 705) for storing schedules of broadcast programs of AM, FM and TV stations. Means are provided in the AIM 700 so that the schedules and auxiliary information stored in the tape 703, the disk 704 or semiconductor memory 705 can be updated periodically. The updating means may be a floppy drive 706 and/or a modem 707 coupled to a telephone line which is in turn coupled to an information provider.

25

A display 708, a printer 710, and headphones 712 coupled to audio circuitry 711 are provided to facilitate communication with a user.

30

The CPU 701 is coupled to a socket 709 where the memory 607 from a user can be inserted.

35

In operation, upon registering the programs of interest into the memory 607 as described above, a user can insert it into the socket 709 of the AIM 700. The CPU 701 reads the identification (channel, date and time) of the program from the memory 607 and uses this identification to search its memory, 703, 704 or 705 for information relating to the identified program. The information may include, for example, the title of a song, author or singer, price of a record or album for the song, etc. It may also be the program itself or a program related to the identified program.

1                   The information can be stored in an AIM 700 in different formats. For  
example, if the information to be provided is for identifying an album of a song, then the  
information may simply be a standard UCC product identification bar code number which  
5                   most record stores have been using to monitor their inventory. This UCC number can be  
incorporated as part of the information stored in the AIMs in the form of a broadcast station  
program schedule for a particular day as follows:

10                  Station Frequency (e.g. FM 98.7)

                  Date (e.g. 11/9/1991)

                  Start Time (e.g. 13:01:03)

                  - End Time (e.g. 13:05:06) UCC number/Track

                  Start Time (e.g. 13:05:06)

15                  - End Time (e.g. 13:08:18) UCC number/Track

                  Start Time (e.g. 13:08:18)

                  - End Time (e.g. 13:08:48) station commentary

20                  To further illustrate operation of the AIM, assuming a user was listening to FM  
99.9, and at 1:05 pm on November 9, 1991. The "BROADCAST INFO" key is actuated  
because a song of interest was heard on that station. At that time, the frequency (i.e. FM  
99.9) of the station, along with the time at which the key was activated, would be stored in  
the non-volatile memory 607. When the non-volatile memory 607 is later inserted into a  
AIM 700 (which is located, for example, in a record store), the channel, date and time data  
25                  ("CDT") are then used by the AIM 700 to locate the UCC number and track of the song.

                  From the UCC number and the track number, the user can retrieve other  
auxiliary information regarding the song, including the store stock level and the price of the  
album.

30                  The retrieved information can be displayed on the display, printed out on the  
printer, and/or provided to the user in audio from the tape 703 drive via the headphones 712.

                  If an AIM does not have information concerning an identified program (such  
as when the AIM belongs to a record store and an identified program is for a commercial of  
a automobile), an error message is displayed or printed so that the user is advised to take the  
35                  memory to the right AIM.

                  After the information is retrieved, the AIM may give an option to the user to  
erase the corresponding identification from the memory 607.



1                   Although the invention has been described above with reference to a radio, its application is not so limited. For example, instead of identifying radio programs, a device embodying the present invention can be used to identify a television program. Moreover, an alternate embodiment may be implemented to allow a user to retrieve the program itself or an associate program. For example, the user may want to listen to the identified program again (such as a comedy or a commentary). In this case, the CPU 701 uses the program identification to retrieve a copy of the program and replays it on the audio circuit 711, so that the user can listen to it at the earphones 712. Alternatively, a user may want to watch a television again. In that case, the CPU 701 uses the program identification to retrieve a copy of the program and replays it on the display 708. Another important feature of the AIM 700 is that it stores the information retrieved from the user's RAM chip memory 607, and furnishes that information to the information provided. This information yields valuable audience monitoring data concerning the popularity of various broadcast stations, musical selections and advertisements. The user information may be stored on the hard disk 704, and periodically provided to the information provided via the floppy drive/disk 706 on the telephone line/modem 707.

20                   Another alternate embodiment of the present invention is shown in Fig. 8. This unit 800 has the advantage that it can be used with all existing receivers without modification thereto. Fig. 9 is a schematic block diagram illustrating an internal design of the unit 800.

25                   With reference to both Figs 8 and 9, the unit 800 comprises a battery powered pocket size digital clock 802 having an LCD display 801. The clock 802 is implemented using TIME and DATE keys so that it measures day as well as hour, minute and, optionally, second. A set of station preset keys 804 are provided to allow a user to set the unit 800 to a plurality of preferred frequencies using the STATION and SET keys.

30                   Within the unit 800 is a central processing unit (CPU) 803 which controls operation thereof, and a memory 805, such as a random access memory (RAM) which is used for storing program identifications.

                  The unit 800 does not need to have a radio receiver circuit. When actuated, it merely operates to store the station frequencies and the value of the clock.

                  Optionally, provisions are made to let a user enter his user identification such as a social security number using the USER ID and STATION PRESET keys.

35                   The unit 800 also includes a plug 807 for interfacing to an AIM, as described above. In operation, a user sets the unit 800 to the station being listened to, either by the preset keys or manually. When the user hears a program of interest and desires to obtain information for the program, the INFO key 810 can be actuated. This action causes the value

1 of the clock 802, as well as the station identification to be stored in the memory 805. These  
information can then be used to retrieve information from an AIM in the same manner as  
described above.

5 Optionally, the unit 800 has a circuit for reading the clock 713 when it is  
connected to an AIM. In this way, the clock 802 can be synchronized by the AIM.  
Alternatively, the unit 800 may have a microphone 808 whereby the clock 802 can be  
synchronized through audio time tones broadcast by an external radio.

10 In the same way as described above, the unit 800 may be equipped with means  
for storing identifications of different publications and I PLUS codes to retrieve information  
relating to a published article or advertisement.

15 While the invention has been described with reference to a preferred  
embodiment, it will be understood that additions, modifications and adaptations can be made  
without substantially diverging from the scope of this invention, which is defined in the  
claims set forth below.

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## WHAT IS CLAIMED IS:

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1. Apparatus for facilitating access of auxiliary information relating to a broadcasting program, comprising:

a memory,

means for receiving an input signal from an audience,

means for providing a time measure,

10

means responsive to said input signal for providing a first identification of said program as a function of the time measure when said input signal is received, and

means for storing said first identification in said memory.

15

2. Apparatus as in claim 1, further comprising a time-of-day clock coupled to said identification providing means for providing said time measure.

20

3. Apparatus as in claim 1, further comprising means for transmitting said first identification to a program information retrieval system which stores said auxiliary information.

25

4. Apparatus as in claim 3, wherein said transmitting means comprises a dual tone multiple frequency generator for transmitting said first identification to such program information retrieval system through a telephone connection.

30

5. Apparatus as in claim 3, further comprising means for receiving said auxiliary information from such program information retrieval system.

6. Apparatus as in claim 5, wherein said means for receiving said auxiliary information comprises means for receiving said auxiliary information encoded in dual tone multiple frequency.

35

7. Apparatus as in claim 5, wherein said means for receiving said auxiliary information comprises a recorder and means responsive to a signal from such program information retrieval system for selectively enabling and disabling said recorder.

8. Apparatus as in claim 7, wherein said recorder is a cassette tape recorder.

1

9. Apparatus as in claim 3, further comprising means for facilitating selection by the audience of said first identification from said memory for transmission to such program information retrieval system.

5

10. Apparatus as in claim 1, further comprising means for receiving broadcast programs from a plurality of stations and wherein said identification providing means further comprises means for providing a second identification of said program as a function of the station broadcasting said program.

- 10

11. Apparatus as in claim 10, further comprising a time-of-day clock coupled to the identification providing means for providing said time measure.

15

12. Apparatus as in claim 10, further comprising means for transmitting said first and second identifications to a program information retrieval system wherein said auxiliary information is stored.

20

13. Apparatus as in claim 12, wherein said transmitting means comprises a dual tone multiple frequency generator for transmitting said first and second identifications to such program information retrieval system through a telephone connection.

25

14. Apparatus as in claim 12, further comprising means for receiving said auxiliary information from such program information retrieval system.

30

15. Apparatus as in claim 14, wherein said means for receiving said auxiliary information comprises means for receiving said auxiliary information encoded in dual tone multiple frequency.

35

16. Apparatus as in claim 14, wherein said means for receiving said auxiliary information comprises a recorder and means responsive to a signal from such program information retrieval system for selectively enabling and disabling said recorder.

17. Apparatus as in claim 16, wherein said recorder is a cassette tape recorder.

1

18. A system for communicating information between an audience and a broadcast station, comprising:

5

an electronic program information retrieval system for storing information relating to programs broadcast from the broadcast station,

means coupled to said electronic program information retrieval system for receiving a request from the audience, and

10

means responsive to said request for retrieving information identified by said request and transmitting said information to the audience.

15

19. A system as in claim 18, further comprising means for receiving said request through a telephone connection.

20. A system as in claim 18, further comprising means for transmitting said information to the audience through a telephone connection.

20

21. A system as in claim 20, further comprising means for generating a dual frequency multiple tone signal to switch on a recording device before transmission of said information and a dual frequency multiple tone signal to switch off said recording device after completion of said transmission.

25

22. A system as in claim 18, further comprising means for storing said information as a function of respective time instances at which said programs are broadcast.

23. A system as in claim 22, further comprising means for decoding a request according to said function of time instances in retrieving said information.

30

24. A system as in claim 23, further comprising means for receiving said request through a telephone connection.

35

25. A system as in claim 24, further comprising means for transmitting said information to the audience through the telephone connection.

26. A system as in claim 25, further comprising means for generating a dual frequency multiple tone signal to switch on a recording device before transmission of said

1 information and a dual frequency multiple tone signal to switch off said recording device after said transmission.

5 27. A system as in claim 22, further comprising means for storing said information as a function of respective stations from which said programs are broadcast.

10 28. A system as in claim 27, further comprising means for decoding a request according to said function of stations in retrieving said information.

29. A system as in claim 28, further comprising means for receiving said request through a telephone connection.

15 30. A system as in claim 29, further comprising means for transmitting said information to the audience through said telephone connection.

20 31. A system as in claim 30, further comprising means for generating a dual frequency multiple tone signal to switch on a recording device before transmission of said information and a dual frequency multiple tone signal to switch off said recording device after said transmission.

25 32. A system as in claim 18, further comprising means for recording information relating to said request.

33. A system as in claim 32, further comprising means for generating audience-monitoring data based upon said information relating to said request.

30 34. A system as in claim 33, wherein said audience-monitoring data include data for monitoring popularity of a program.

35 35. A system as in claim 33, wherein said audience-monitoring data include data for monitoring popularity of a station.

36. A receiver of broadcast programs, comprising:  
means for receiving broadcast programs from a plurality of stations broadcasting at different frequencies.

1

a clock for providing a continuous time measure at least in hours and minutes,  
and

5

means for instantaneously identifying a broadcast program, comprising:  
a memory,  
means for receiving an input signal from a user, and  
means responsive to said input signal for storing a program identification  
into said memory, said program identification comprising the time measure when said input  
signal is received and an identification of the station from which the program is broadcast.

10

37. A receiver as in claim 36, further comprising means for retrieving said  
program identification from said memory and means for transmitting said program  
identification to a program information retrieval system.

15

38. A receiver as in claim 37, wherein said transmitting means comprises  
means for generating a dual tone multiple frequency signal.

20

39. A receiver as in claim 38, where said transmitting means further  
comprises means for providing a telephone connection.

25

40. A receiver as in claim 36, wherein said means for receiving broadcast  
programs is a television.

41. A receiver as in claim 36, wherein said means for receiving broadcast  
programs is a radio.

30

42. A system for providing auxiliary information relating to a broadcast  
program, comprising:

35

means for receiving a memory, said memory storing data, including data  
relating to said broadcast program,  
means for storing said auxiliary information,  
means responsive to said data from said memory for locating said auxiliary  
information from said storing means, and  
means for outputting said auxiliary information.

1

43. A system as in claim 42, wherein said auxiliary information includes respective time measures when programs were broadcast.

5

44. A system as in claim 42, wherein said auxiliary information includes respective stations from which programs were broadcast.

10

45. A system as in claim 42, wherein said auxiliary information includes a UCC number of an album.

15

46. A system as in claim 42, wherein said storing means also stores the programs and wherein said system further comprises means for outputting said program when requested by a user.

20

47. A system as in claim 42, further comprising means for generating audience-monitoring data from data stored in said memory.

48. A system as in claim 47, wherein said audience-monitoring data include data for monitoring popularity of a program.

49. A system as in claim 47, wherein said audience-monitoring data include data for monitoring popularity of a station.

25

50. A method for facilitating a user to identify programs of interest, instantaneously at time instances when the programs are being broadcast from a station, comprising the steps of:

30

monitoring for an actuation signal, and  
storing, in response to the actuation signal, a time-of-day clock value at the time instance when the actuation signal is received.

35

51. A method as in claim 50, further comprising the step of storing, in response to the actuation signal, an identification of the station.

52. A method for improving communication between a user and a station, comprising the steps of:

the steps recited in claim 51.



1

transmitting a request to a program information retrieval system which stores auxiliary information relating to programs broadcast from said station, said request including the time-of-day clock value,

5

retrieving the auxiliary information from the program information retrieval system in response to said request, and  
transmitting the retrieved information back to a user.

10

53. The method of claim 52, further comprising the step of generating audience-monitoring data based upon said request.

15

54. The method of claim 53, wherein said audience-monitoring data include data for monitoring popularity of the programs.

20

55. The method of claim 53, wherein said audience-monitoring data include data for monitoring popularity of the station.

25

56. A method for providing information associated with a broadcasted program comprising the steps of:

30

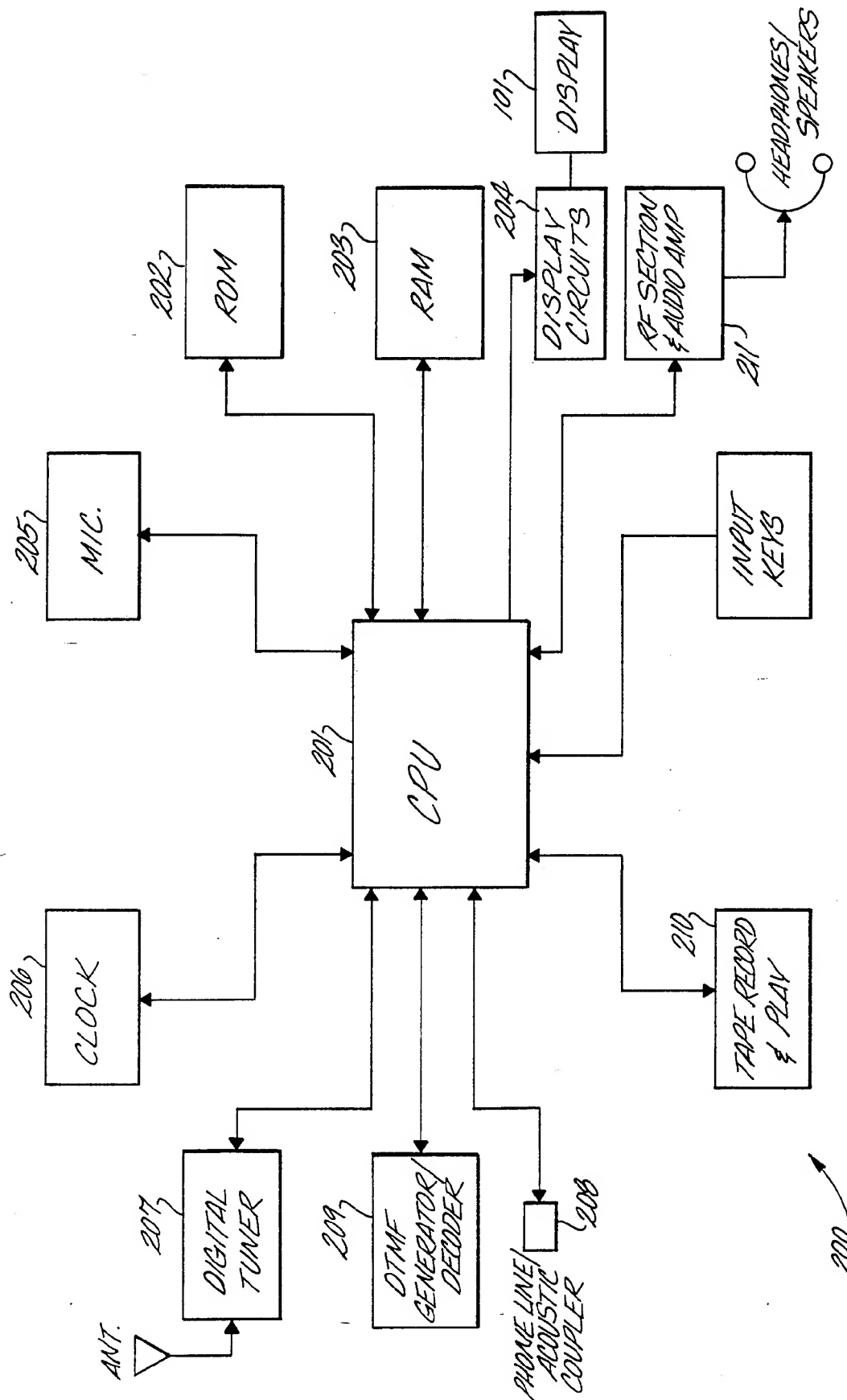
receiving a user request and coded program identifier information;  
decoding the program identifier information;  
retrieving from a memory the information associated with the decoded program identifier information;

35

providing a first command signal to the user;  
providing the retrieved information to the user; and  
providing a second command signal to the user.

35



*Fig. 2*

PORTABLE RADIO/TAPE UNIT

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Fig. 3a

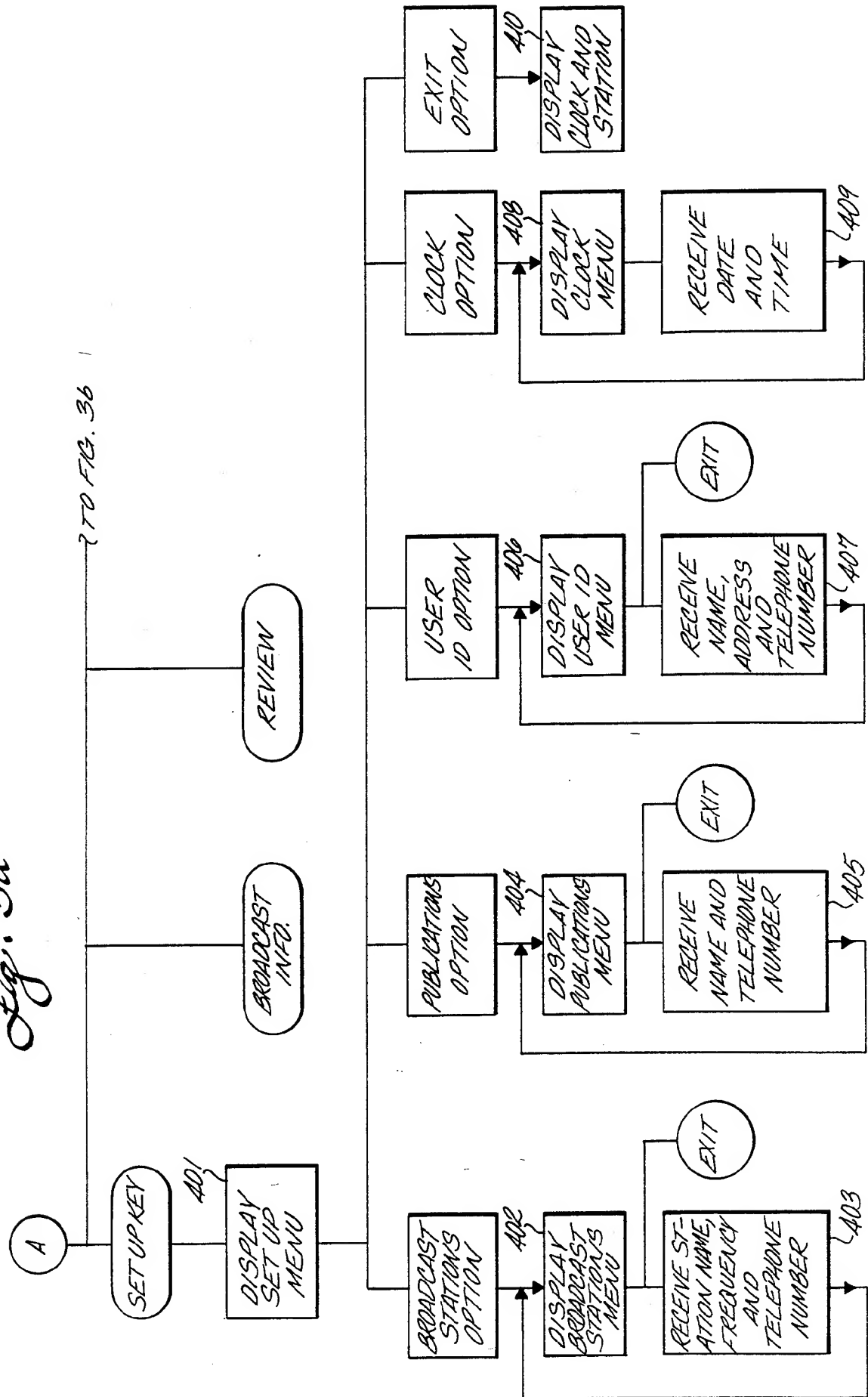
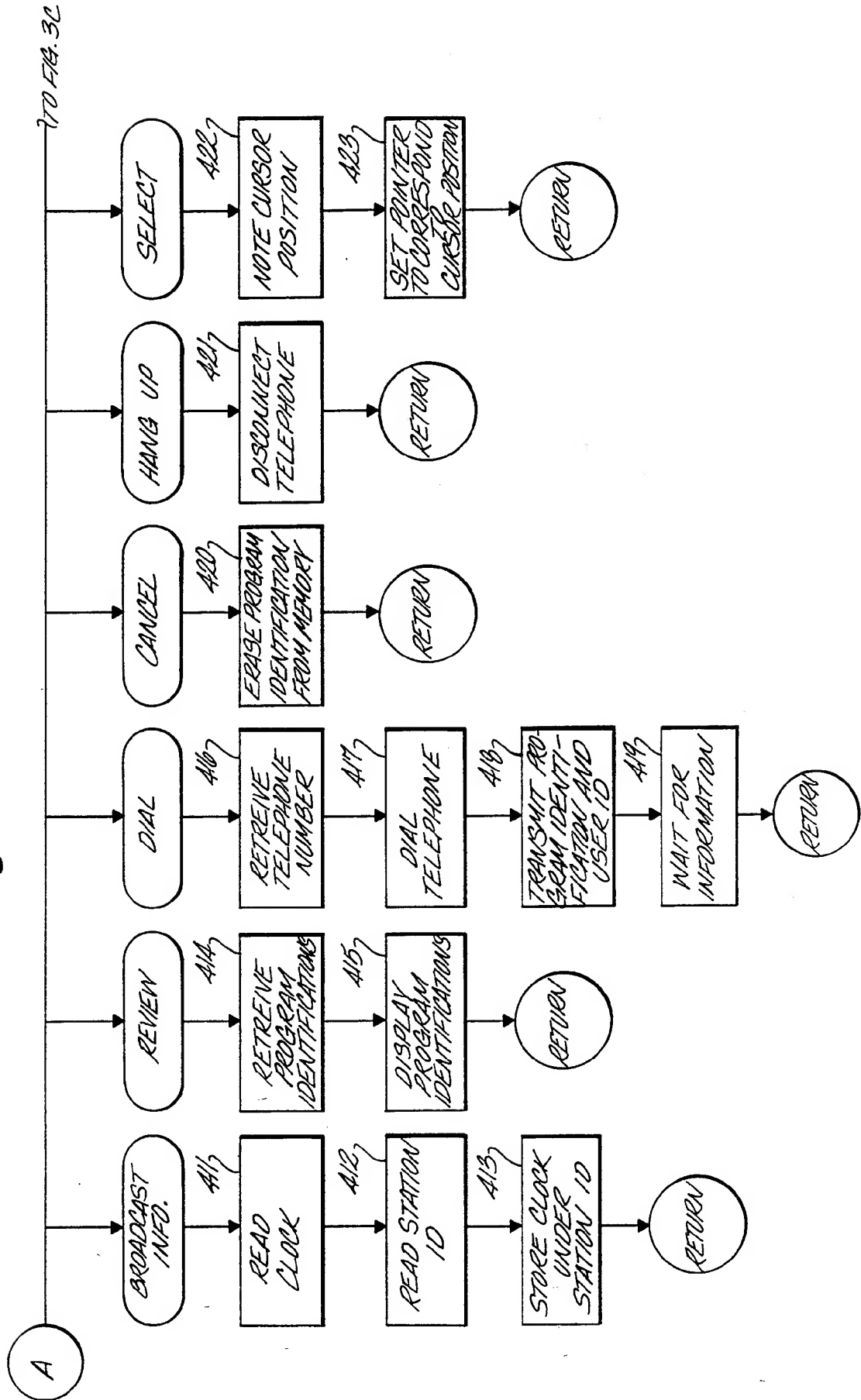
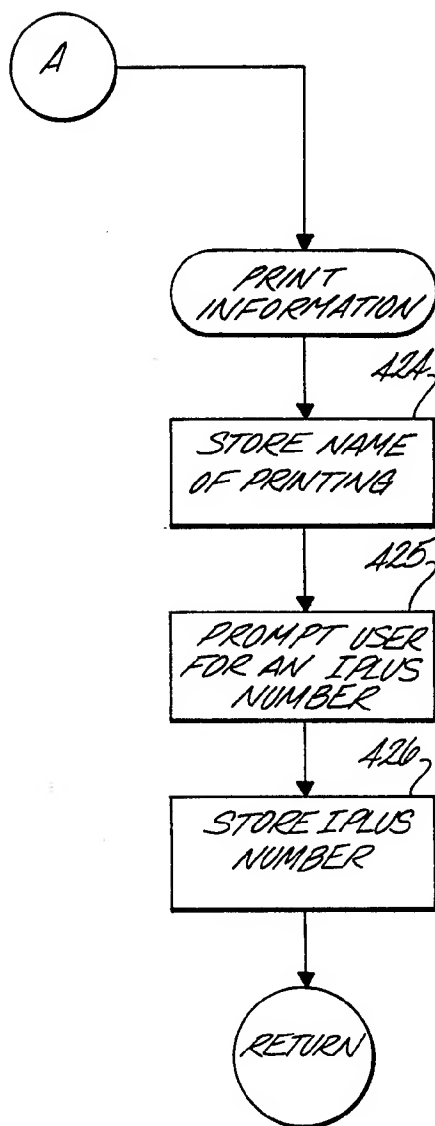


Fig. 3b



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*Fig. 3c*

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*Fig. 4a*

<i>SET UP MENU</i>	
<i>1. BROADCAST STATIONS</i>	
<i>2. PUBLICATIONS</i>	
<i>3. USER ID</i>	
<i>4. CLOCK</i>	
<i>5. EXIT</i>	

*Fig. 4b*

<i>BROADCAST STATIONS</i>			
<i>PRESET</i>	<i>NAME</i>	<i>NUMBER</i>	<i>TELEPHONE</i>
<i>1</i>	<i>KKGO</i>	<i>105.1</i>	<i>800-777-2211</i>
<i>2</i>	<i>KPTH</i>	<i>101.1</i>	<i>800-549-8765</i>
<i>3</i>	<i>TV</i>	<i>2</i>	<i>800-932-6789</i>
<i>1</i>			
<i>EXIT</i>			

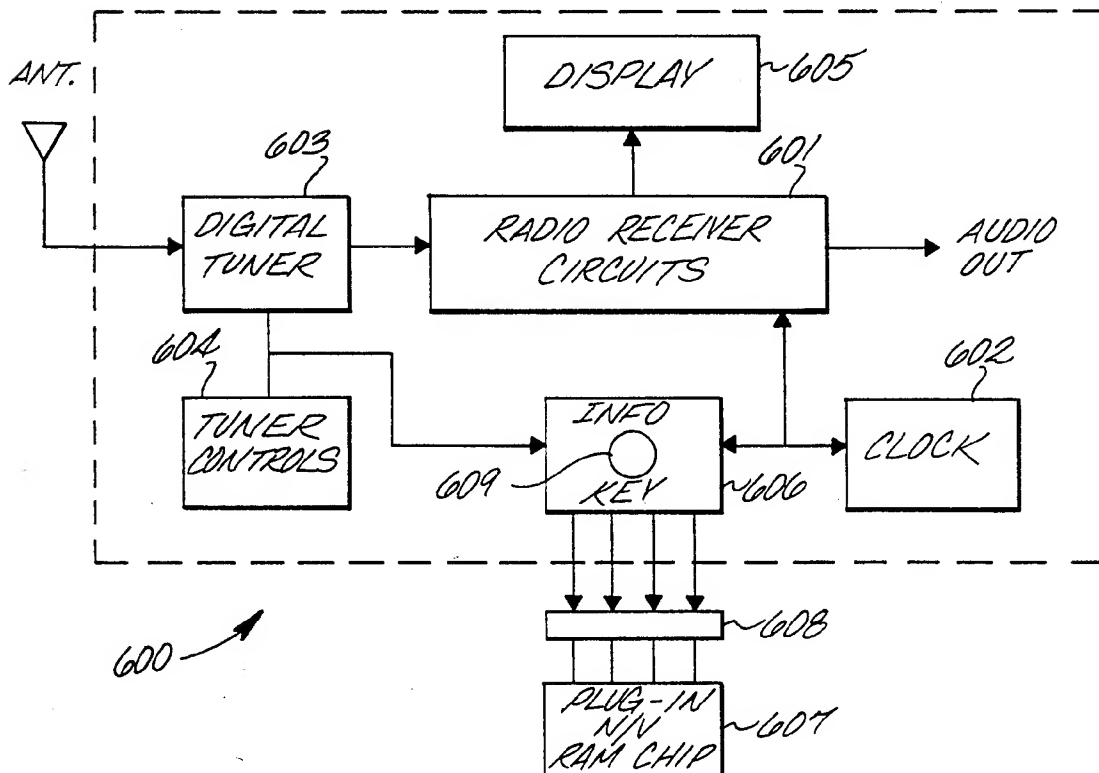
*Fig. 4c*

<i>PUBLICATIONS</i>		
<i>PRESET</i>	<i>NAME</i>	<i>TELEPHONE</i>
<i>1</i>	<i>LAT</i>	<i>800-949-3256</i>
<i>2</i>	<i>TIME</i>	<i>800-437-5432</i>
<i>3</i>	<i>BARRON'S</i>	<i>800-844-6514</i>
<i>1</i>		
<i>EXIT</i>		

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*Fig. 4d*

<i>USER ID</i>	
<i>NAME:</i>	_____
<i>ADDRESS:</i>	_____
	_____
<i>TELEPHONE:</i>	_____

*Fig. 6**CAR/HOME RADIO/TV VERSION*



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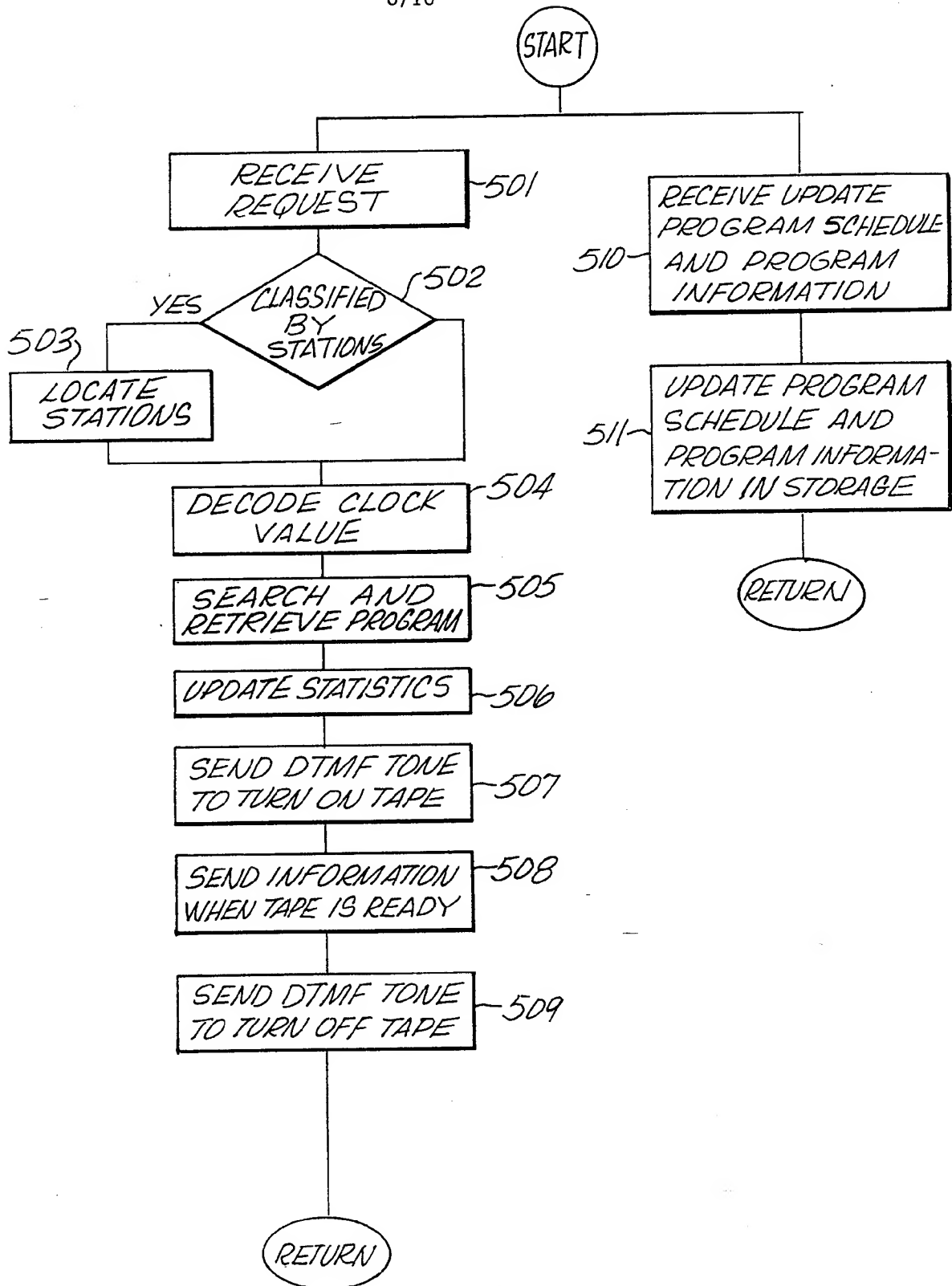


Fig. 5

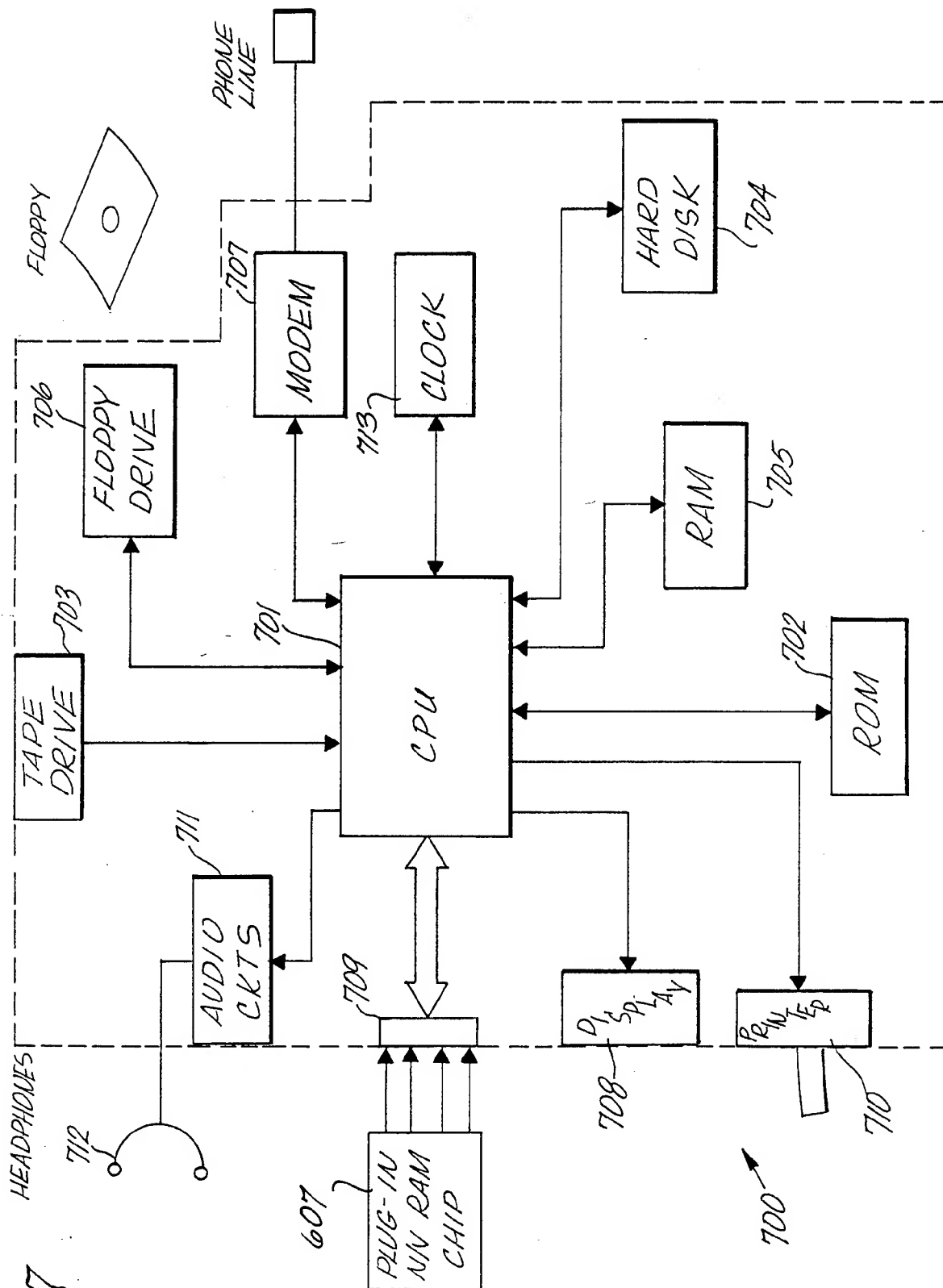
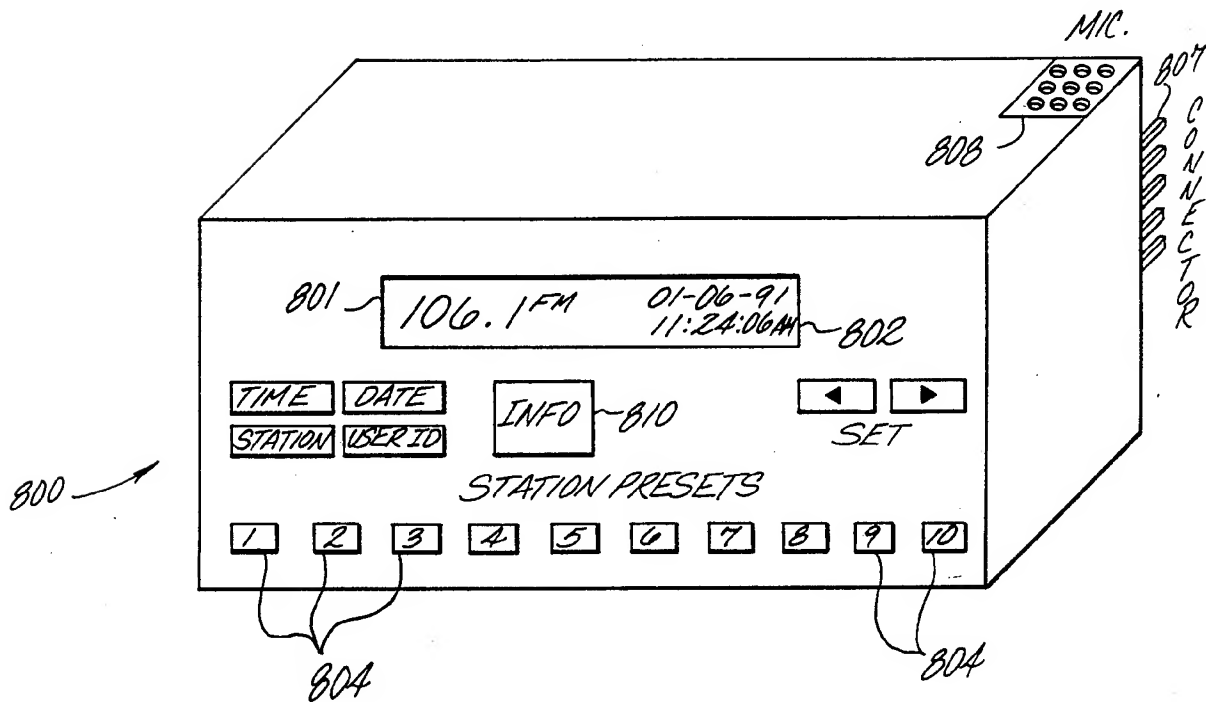


Fig. 7

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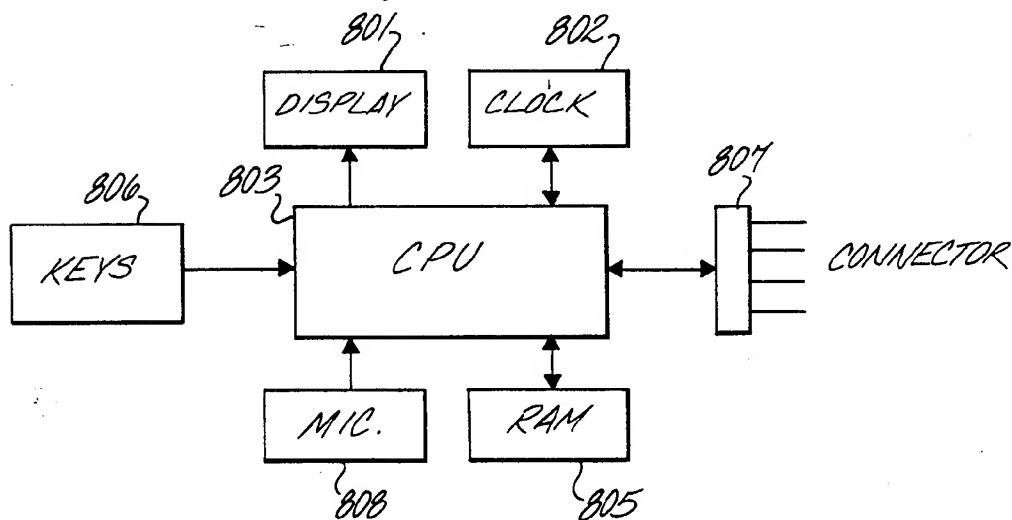
*Fig. 8*

STAND-ALONE UNIT



*Fig. 9*

STAND-ALONE UNIT



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US93/05939**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(5) :G11B 17/22

US CL :369/30

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 369/30,29, 24, 32; 358/84; 455/2; 379/92

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	US,A, 5,162,905 (ITOH et al.), 10 NOV 1992, see col.1, lines 38 +	1-3, 5-12, 14-18, 22, 23, 27, 28, 32, 36-38, 40, 41-46, and 50-56
Y,P	US,A, 5,155,762 (CROQUET et al.), 13 OCT 1992, see abstract	1-56
Y	US,, A, Re. 17,023 (CLEMENT), 03 JUL 1928, see col. 1, lines 1-20.	1-56

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be part of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

29 September 1993

Date of mailing of the international search report

01 OCT 1993

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